

REMARKS

We have carefully considered the Office Action dated September 5, 2003, in which allowable subject matter was found in claims 58, 61, 64 and 67 and the remaining claims stand rejected. As discussed below, we have amended certain claims in response to the rejections, and we have amended claims 58, 61, 64 and 67 to incorporate the subject matter from which they depend. We discuss specific claims below.

Claims 12, 26, 40 and 54 are rejected under Section 112. We refer the Examiner to page 6, line 15 which reads "the string may also be based upon, at least in part, a concatenation of a plurality of numerical hash values derived from the one or more images ..." Thus, there is one string that is produced by the system and the string may be based on a plurality of hash values. As also set forth on page 6, lines 1-2, the numerical values which the Examiner is referring to may be, for example, "representative of one or more hash values." Accordingly, the subject matter of claims 12, 26, 40 and 54 is supported by the specification.

Claims 4, 18, 32 and 46 are also rejected under Section 112. However, we point out that in line 2 of the respective claims the workpiece is referred to as a "postal mailpiece," and thus, the phrase "said mailpiece" in line 3 has proper antecedent basis. We have amended claim 18 to correct a typographical error.

Claims 7 and 21, and 8 and 22 are rejected under Section 112. The Examiner questions the wording of claims 7 and 8 regarding the use of different oblique angles and an identical azimuthal angle with respect to the workpiece, and also, different azimuthal

angles and an identical oblique angle with respect to the workpiece. For purposes of explanation, we refer to the azimuthal angle with reference to a compass that is parallel to the surface of the workpiece. We will call 0 degrees on the compass the North direction, 90 degrees on the compass East, 180 degrees on the compass South, and 270 degrees on the compass West. The elevation angle is the angle off the plane of the workpiece. Angles near zero degrees of elevation correspond to oblique angles. Ninety degrees of elevation corresponds to a line that is perpendicular to the surface of the workpiece.

An example of an illumination condition that is characterized by identical azimuthal and different (oblique) elevation angles is two LEDs at the same azimuthal angle (say East), one 10 degrees above the workpiece surface, and another 20 degrees above the workpiece surface. To an observer on the workpiece, the light sources would be at the same compass heading, but different overhead elevations (one would be 10 degrees above the "horizon" of the workpiece surface, the other 20 degrees above the horizon).

An example of an illumination condition that is characterized by identical (oblique) elevation angles and different azimuthal angles is two LEDs that are both 10 degrees above the horizon of the workpiece surface, one in the East, and one in the North.

Accordingly, the wording of claims 7 and 8 and the corresponding wording of claims 21 and 22 should now be clear.

Finally, claims 27, 41 and 55 are rejected under Section 112. In light of the Examiner's comments we have amended these claims to make clear that the differences referred to are between selected images.

The majority of claims are rejected as obvious over a combination of PCT Publication No. WO97/24699 (Karaikan), and European Patent 0878778 (Sansone).

We will discuss the current system below in terms of the subject matter of various independent claims, and contrast that subject matter with the teachings of the Karaikan and Sansone references.

The current system, as set forth in amended independent claims 1, 14 and 42, illuminates a workpiece surface with electromagnetic radiation simultaneously from different illumination positions and produces one or more corresponding images. This is in contrast to the teachings of the Karaikan reference which, in the first full paragraph on page 20 describes an image that is produced when a workpiece surface is illuminated from only one direction. Further, in the next full paragraph on the same page the Karaikan reference describes how two or more images are produced when the workpiece surface is sequentially illuminated from two or more directions. Further, the Karaikan reference, on page 23 beginning at line 9, describes an embodiment in which the system produces respective images that correspond to illuminating the workpiece sequentially from different directions. Specifically, the Karaikan system produces digital signals x and y that correspond respectively to images x and y, which are produced by illuminating the workpiece sequentially from two different directions. As described on page 24, the images x and y are later combined by subtraction, to form "a derived image L."

The advantages of simultaneous illumination are many. For example, the simultaneous illumination captures only the more robust features, such as deep craters or high mountains. In contrast, the single illumination or sequential illumination captures,

in addition to the robust features, lower mountains, shallower craters and so forth, which are more susceptible to damage or wear. Accordingly, the authentication operations, which rely essentially on reproducing the image or images by again illuminating the workpiece surface, are more reliable with simultaneous multiple illumination, since the damage or wear to, for example, the lower mountains, does not adversely affect the operations.

The simultaneous multiple illumination also gives you better overall reliability in terms of invariance to orientation, that is, the ability to authenticate a workpiece even if the orientation of the workpiece differs between the enrollment or indicium-creating operation and the authentication operation. The orientation of the workpiece is relative to the light sources. Accordingly, the orientation to a single light source or respective sequentially operated light sources must be essentially the same for the enrollment and authentication operations. Otherwise, the differences in the images produced during enrollment and authentication will trigger false rejections. Using multiple simultaneous sources, however, the orientation can differ with respect to a given source and still be appropriate relative to the combination of light sources. The authentication operation is thus more reliable, and it can proceed more quickly, since the orientation requirements are relaxed.

As discussed, the simultaneous multiple illumination operations provide distinct advantages in terms of reliability and speed over the sequential illumination operations. The failure of the Karaihan reference to discuss illuminating the workpiece in this manner points out that it was not obvious to do so based on the underlying teachings of

Karaikan. Further, the combination of the Sansone reference, which adds to the teachings of Karaikan that the workpiece may be a mailpiece, does not make obvious the use of the simultaneous multiple illumination. Accordingly, the combination does not show, teach or suggest the invention as set forth in independent claims 1, 14 and 42, as amended, and the claims that depend therefrom.

The current system, as described in amended claims 28 includes a step of filtering the one or more images to produce filtered images in which selected higher spatial frequencies of the one or more images are emphasized. The filtering thus promotes those workpiece surface features that provide the best discrimination, i.e., that are the best to use in making a decision of whether or not the images produced during enrollment and during authentication match. An example of this type of filtering is the longitudinal high-pass filtering described in the specification beginning on page 13.

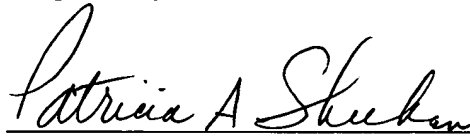
In contrast, the Karaikan reference teaches subtracting the images. See, page 23, line 9 et seq. While subtracting the images may reduce or eliminate the DC component, the subtraction is not a filtering that emphasizes higher spatial frequencies. Accordingly, the Karaikan reference does not teach or suggest the filtering step as set forth in claim 28, as amended, or the claims that depend therefrom. Further, the combination of Sansone with the Karaikan reference, that is, the adding to Karaikan that the workpiece may be a mailpiece, does not result in the teaching of the filtering step of independent claim 28 and the claims that depend therefrom.

The remaining independent claims, namely, claims 58, 61, 64 and 67, include the subject matter that the examiner has found to be allowable. Accordingly, the claims that depend from these claims should also be allowable.

The claims, as amended, should now be in form for allowance. We request that the Examiner reconsider the rejections and issue a Notice of Allowance for all pending claims.

Please charge any fee occasioned by this paper to our Deposit Account
No. 03-1237.

Respectfully submitted,

A handwritten signature in cursive script, reading "Patricia A. Sheehan". The signature is written in dark ink and is positioned above the printed name.

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